Address Element (size)	Explanation
Census Block (15)	The full block code (e.g. 08013012205203A).
Census Block Only (3)	The full block code (e.g. 03A).
LOT (Line of Travel) Number (4)	The numeric LOT code used for presort.
LOT Direction Flag (1)	LOT direction, "A" = Ascending, "D" = Descending.
LACS Status (1)	Locatable Address Conversion Service Status Indicator; "L" = old (usually rural route) address which has been converted for the LACS system, blank = not applicable.
ZIP Classification (1)	Describe type of area that a 5-digit ZIP Code serves. "M" = military ZIP Code, "P" = P.O. Boxes Only, "U" = unique ZIP Code (single organization), blank = standard ZIP Code.
ZIP Facility (1)	Returns the USPS City State Name Facility Code:

A = Airport Mail Facility (AMF)
B = Branch
C = Community Post Office (CPO)
D = Area Distribution Center (ADC)
E = Sectional Center Facility (SCF)
F = Delivery Distribution Center (DDC)
G = General Mail Facility (GMF)
K = Bulk Mail Center (BMC)
M = Money Order Unit
N = Non-Postal community name
P = Post Office
S = Station
U = Urbanization

City Delivery (1)	Indicates whether a Post Office has city-delivery carrier routes.
Carrier Route Sortation (1)	Indicates whether a discount is provided for letter-sized carrier route sorted mail in current ZIP Code.
Extra Line 1-6 (103)	Used to capture data contained in unassigned address lines.
Old Address Line (60)	**Returns the standardized original full address line, e.g. "1920 MAIN ST W APT 12".**
Old City Name (28)	**Returns the standardized original USPS city name (e.g. BOULDER).**
Old State Abbreviation (2)	**Returns the standardized 2-letter state abbreviation (e.g. CO) for original address.**
Old ZIP9 (9)	**Returns the complete ZIP+4**

Address Element (size)	Explanation
	(e.g. 803011234) for original address.
Old Carrier Route (4)	Returns the Carrier Route ID number for original address.
Old Delivery Point Barcode (2)	Returns the Delivery Point Bar Code for original address.
Old Check Digit (1)	Returns Check Digit for original address.
Old House Number	Returns the house number for original address.
Old Primary Pre-Directional (2)	Returns the pre-directional (e.g. NW) for original address.
Old Primary Street Name (40)	Returns the street name (e.g. MAIN) for original address.
Old Primary Street Suffix (4)	Returns the street suffix, or type (e.g. ST) for original address.
Old Primary Post-Directional (2)	Returns the post-directional (e.g. E) for original address.
Old Unit Number (11)	Returns the unit or apartment number (e.g. 2A) for original address.
Old Unit Designator (4)	Returns the unit designator (e.g. STE) for original address.
Move Effective Date (6)	Returns the date forwarding went into effect for address (MMDDYY).
Move Type (1)	Returns the type of forwarding order in effect for record: B = Business change of address. F = Family change of address. I = Individual change of address.
Move Match Flag (1)	Additional forwarding information: K = Moved, left no forwarding address. G = P.O. Box closed, no forwarding address. F = Forwarding to foreign address. M = Forwardable address.

Note: Latitude and Longitude must be used together, or not at all.
In an xBASE file, if the field for Latitude and Longitude are numeric and have 0 decimal places. Latitude and Longitude will be returned in millionths of degrees. ASCII files will always receive decimal degrees.

Chapter 9

The Demographic Coding Module

About the Demographics Module

With the information age upon us, many companies are changing their
methods of database marketing. Corporations now use demographic
information to target their marketing campaigns, forecast sales, determine
market penetration, assess market potential, and more. Demographic coding
of existing databases is an important part of this process. Qualitative
Marketing Software's Demographic Coding module allows you to append
valuable demographics to your own databases.

Specifying Demographic Input Fields

Once you have selected a file to process, the input fields are filled in
automatically, if possible, by looking at the input file's field names and any
fields assigned in the Address Coding module. Only fields required for
demographic coding, such as *Block Group*, are enabled. If any required input
fields were not filled in, or were not filled with the correct field, click the
drop-down arrows to select the correct field. If you wish to remove a field,
select the special field **<none>** at the top of the list box of field names.

Process if Field is Blank

The **Process if Field is Blank** option lets you process only those records with missing data in a particular field, which you specify using the drop-down list. This is useful for "cleaning up" a previously processed database.

Assigning Demographic Output Fields

The *Assign Outputs* section of the Demographics dialog is where you associate address data elements with output field names. By default, the list of Field Names is the same as the input fields in the *Define Input Fields* section of the dialog. You can assign demographics to existing field names, or create new fields to receive the data.

The output data elements are dependent on which demographics data files you have licensed. All users can access the 1990 Census data, contained in the file Census90.dld. If no data elements are listed under *Available Outputs*, be sure that the file Census90.dld is in one of the locations specified in the Centrus Configuration dialog. You may need to insert the Supplemental Data CD-ROM, or copy the file from the CD-ROM to the Centrus directory on your hard drive.

Assigning Field Names

To associate a data element with an output field:

1. Select a field name by clicking it.

2. Select the desired demographic data element by clicking it.

3. Click the **<<Assign** button

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. A "D:" appears before the data element, signifying that the data is being assigned by the Demographics module.

Creating New Fields

To create a new field:

1. Select the desired data element by clicking it.

2. Click the **<<New** button. A New Field dialog will appear.

3. Specify the name, type, width, and (if numeric) decimal places desired, or click **OK** to accept the default values.

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. A "D:" appears before the data element, signifying that the data is being assigned by the Demographics module.

Unassign

If the currently selected field is an input field, clicking the **Unassign>>** button will remove its output assignment. If the currently selected field is a new field, clicking the **Unassign>>** button will delete it.

Blank if Unmatched

If you check the **Blank if Unmatched** box, *all* output fields defined within the Demographics module will be cleared if the record cannot be matched. If you want to retain unmatched input addresses, either assign Demographics elements to new fields rather than input fields, or be sure the **Blank if Unmatched** box is not checked.

Available Demographics Elements

All Centrus users can access 1990 Census data; those data elements are listed below. If you've licensed premium demographics, additional data elements are available. See "Premium Demographics" on page 115 for details.

1990 Total Population
1990 Total Female Population
1990 Households
1990 Median Age
1990 Median Age Female
1990 Median Age Male
1990 Total Housing Units
1990 Families
1990 Average Household Size
1990 Aggregate Household ($000's)
1990 Median Household Income
1990 Median Family Income
1990 Median Housing Value
1990 Population in Group Quarters
1990 % White Population
1990 % Black Population
1990 % Asian/Pacific Islander Population
1990 % Am. Indian/Eskimo Population
1990 % Other Race Population
1990 Householder Age 15-24
1990 Householder Age 25-34
1990 Householder Age 35-44
1990 Householder Age 45-54
1990 Householder Age 55-64
1990 Householder Age 65-74
1990 Householder Age 75+

Chapter 10

The Point-in-Polygon and Closest Site Modules

About the Spatial Analysis Modules

The Centrus Spatial Analysis modules give you extremely fast, flexible processing for the most frequently used GIS functions—*Point-in-Polygon* analysis, and Radial or *Closest Site* analysis.

Point-in-Polygon analysis lets you accurately determine which areas a given point falls within. Retail, insurance and telecommunication industries use Point-in-Polygon to identify key markets, insurance risk areas and telephone service areas.

Closest Site analysis is a highly efficient distance test between two sets of points. Healthcare, banking, and insurance industries use Closest Site analysis to match up doctors and patients, find the nearest bank branch to a customer, and to calculate the distance between a home and the closest fire station. Closest Site calculations return the distance from the address to the site point, as well as the name of that site point.

Object Files and Layers

The Spatial Coding modules require geocoded addresses with Latitude/Longitude coordinates as input. If you need to geocode the addresses in your files, we recommend that you use the Centrus Address Coding module, for the quickest, most accurate geocode assignments. You can even geocode and perform spatial analyses in the same task.

The available spatial outputs are determined by the contents of the "object" files or *layers* you have specified in the Options dialog. Geographic features (points, lines or polygons) are imported into the native Centrus format which allows very fast searches. To get your data into our .GSB format, we support MapInfo's .MIF/MID format, as well as ESRI's Atlas GIS .BNA format. For more information about specifying or importing layers, see "Point-in-Polygon Options Tab" on page 31 and "Closest Site Options Tab" on page 32.

Point-in-Polygon Analysis

Point-in-Polygon (or PiP) analysis determines in which object, or objects, a point falls in. This analysis requires a buffered object file, as well as a geocoded address file containing latitude and longitude fields. The Point-in-Polygon module can perform analyses on polygons, as well as buffered lines, buffered points and buffered polygons, referred to as corridors, circles and zones, respectively. Collectively, all of these items are referred to as "objects."

Figure 1: Buffered objects

Buffered Polygon   Buffered Line   Buffered Point
"Zone"   "Corridor"   "Circle"
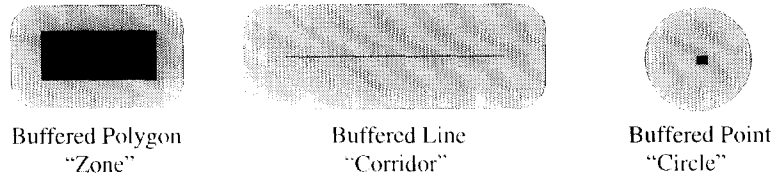
Centrus can process an entire file of points against an object file very rapidly.

Buffered objects allow you to determine if a point (or points) is within 500 feet of a shoreline, or within 2 miles of a store, or within 1.3 miles of a sales territory. The buffering in Centrus is done during the actual test, and therefor is completely dynamic. The only requirement is that the object file (.GSB) be built with buffering enabled.

Specifying Point-in-Polygon Input Fields

The Point-in-Polygon module requires only two input fields: **latitude** and **longitude**. Once you have selected a file to process, the input fields are filled in automatically, if possible, by looking at the input file's field names and any fields assigned in the Address Coding module. If any required input fields were not filled in, or were not filled with the correct field, click the drop-down arrows to select the correct field. If you wish to remove a field, select the special field <none> at the top of the list box of field names.

Buffer Width (Feet)

Enter the size of the buffer to use (in feet) in this box, or "0" (zero) if no buffer is desired

Process if Field is Blank

The **Process if Field is Blank** option lets you process only those records with missing data in a particular field, which you specify using the drop-down list. This is useful for "cleaning up" a previously processed database.

Assigning Point-in-Polygon Output Fields

The *Assign Outputs* section of the Point-in-Polygon dialog is where you associate available outputs with output field names. You can assign outputs to existing field names, or create new fields to receive the data.

By default, the list of Field Names is the same as the input file's fields, plus any fields added during processing by other Centrus modules. The output data elements are dependent on which layers you have specified in the Options dialogs. If no data elements are listed under *Available Outputs*, be sure you have correctly specified your layers in the Options dialog.

Each feature within a PIP layer is associated with three output data elements:

Name is the name of the feature as it is defined in the layer.

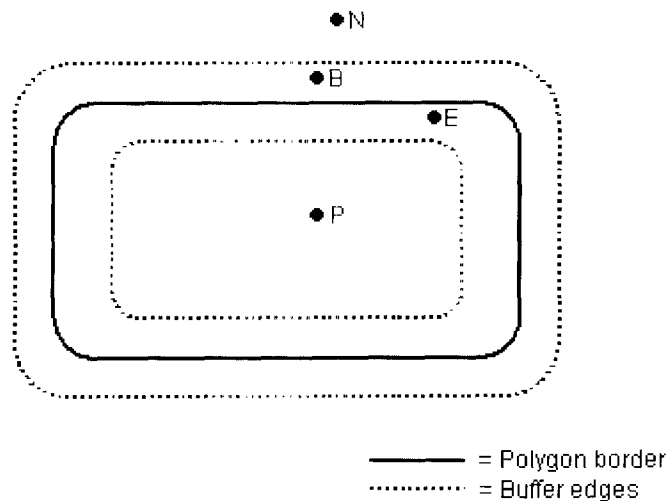**Distance** is the distance from the address to the edge of the polygon.

Status defines where an address lies in relation to the polygon. Status codes are:

P = In polygon
E = Edge; in buffer, inside polygon.
B = In buffer, outside polygon
N = Not found.

——— = Polygon border
············ = Buffer edges

Assigning Field Names

To associate an output data element with an output field name:

1. Select a field name by clicking it.

2. Select the desired output data element by clicking it.

3. Click the **<<Assign** button.

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. A "P:" appears before the data element, signifying that the data is being assigned by the Point-in-Polygon module.

Creating New Fields

To create a new field:

1. Select the desired output data element by clicking it.

2. Click the **<<New** button A New Field dialog will appear.

3. Specify the name, type, width, and (if numeric) decimal places desired, or click **OK** to accept the default values.

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. An "(N)" appears after the field name to signify that it is a new field. A "P:" appears before the data element, signifying that the data is being assigned by the Point-in-Polygon module.

Unassign

If the currently selected field is an input field, clicking the **Unassign>>** button will remove its output assignment. If the currently selected field is a new field, clicking the **Unassign>>** button will delete it.

Blank if Unmatched

If you check the **Blank if Unmatched** box, *all* output fields defined within the Point-in-Polygon module will be cleared if the record cannot be matched. If you want to retain unmatched input addresses, either assign Point-in-Polygon elements to new fields rather than input fields, or be sure the **Blank if Unmatched** box is not checked.

Closest Site Analysis

Closest site analysis compares the geocoded addresses (or other points) in your input file to a geocoded site layer you specify in the Closest Site Options tab. Centrus can identify the closest sites for each point in the input

file. The site's identifier and the straight-line distance to the site can be returned for each site found.

Specifying Closest Site Input Fields

The spatial analysis module requires only two input fields: **latitude** and **longitude**. Once you have selected a file to process, the input fields are filled in automatically, if possible. by looking at the input file's field names and any fields assigned in the Address Coding module. If any required input fields were not filled in. or were not filled with the correct field, click the drop-down arrows to select the correct field. If you wish to remove a field, select the special field **<none>** at the top of the list box of field names.

Maximum Distance (miles)

This setting tells Centrus how far to look for a site. For example, if you are interested only in those sites within 50 miles of an address, you should enter 50 in the **Max Distance (Miles)** box.

Process if Field is Blank

The **Process if Field is Blank** option lets you process only those records with missing data in a particular field, which you specify using the drop-down list. This is useful for "cleaning up" a previously processed database.

Assigning Closest Site Output Fields

The *Assign Outputs* section of the Closest Site dialog is where you associate available outputs with output field names. You can assign outputs to existing field names, or create new fields to receive the data.

By default. the list of Field Names is the same as the input file's fields, plus any fields added during processing by other Centrus modules. The output data elements are dependent on which layers you have specified in the

Options dialogs. If no data elements are listed under *Available Outputs*, be sure you have correctly specified your layers in the Options dialog.

Each feature within a Closest Site layer is associated with three output data elements:

Name is the name of the feature as it is defined in the layer.

Distance is the distance from the address to the closest site in the layer.

Direction is the direction from the address to the closest site in the layer, measured in degrees, with north at 0/360 degrees.

Assigning Field Names

To associate an output data element with an output field name:

1. Select a field name by clicking it.

2. Select the desired output data element by clicking it.

3. Click the **<<Assign** button.

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. A "C:" appears before the data element, signifying that the data is being assigned by the Closest Site module.

Creating New Fields

To create a new field:

1. Select the desired output data element by clicking it.

2. Click the **<<New** button. A New Field dialog will appear.

3. Specify the name, type, width, and (if numeric) decimal places desired, or click **OK** to accept the default values.

The selected data element will appear in the Output Assignment column next to the field name to which it is assigned. An "(N)" appears after the field name to signify that it is a new field. A "C:" appears before the data element, signifying that the data is being assigned by the Closest Site module.

Unassign

If the currently selected field is an input field, clicking the **Unassign>>** button will remove its output assignment. If the currently selected field is a new field, clicking the **Unassign>>** button will delete it.

Blank if Unmatched

If you check the **Blank if Unmatched** box, *all* output fields defined within the Closest Site module will be cleared if the record cannot be matched. If you want to retain unmatched input addresses, either assign Closest Site elements to new fields rather than input fields, or be sure the **Blank if Unmatched** box is not checked.

Chapter 11

Processing

Processing a Data File

Click the ▣ button to process interactively.

Once you've selected an input file, set the processing options, and specified the input and output fields for the modules you are using, Centrus is ready to begin processing. From the main Centrus menu, select **Process**, then choose either **Process Task** for interactive processing, or **Batch Process Task** for batch processing.

Different input files may require different approaches to matching. If you are processing a small number of addresses, and every address is important, Centrus allows you to select processing options to maximize the number of matches while making the best use of your time. If you are processing many thousands, or even millions of addresses, Centrus allows you to process in batch mode for unattended matching.

Batch Processing

If you select **Process|Batch Process Task**, the entire file will be processed in batch mode, letting you configure a different task or perform other work while processing takes place.

Interactive Processing

If you select **Process|Process Task** or click the ▣ button, the Process dialog appears. The first record in the address file is always loaded and processed, regardless of the **Process if Field is Blank** settings in the individual Centrus modules. Each Centrus module displays its current status on its own Process dialog, accessed by clicking the appropriate tab. Modules not currently in use will display neither inputs nor results.

Note that many features of interactive processing are unavailable if you are processing in CASS or Centrus*COA* mode. CASS certification requires that all input records be processed.

The Process Dialog

When using Centrus in CASS mode, all buttons except **Cancel** are disabled. At this time, the USPS does not allow interactive coding when producing a CASS report. If you need to use both interactive coding and produce a CASS report, you will need to process twice.

Each module's Process dialog has an *Inputs* section, a *Results* section, and a *Records* section. The *Inputs* section of a dialog displays the record as it exists in the input file, or input data generated by other Centrus modules. Inputs are directly editable in the Data Locator and Address Coding dialogs, but not in the Demographics, Point-in-Polygon, or Closest Site dialogs.

The processed information is shown in the *Results* section of the dialogs. The data is presented as a hierarchical tree. You can double-click on an item to expand or contract the information display.

The *Records* section contains the processing statistics. It shows the total records processed and the number of records standardized, geocoded, and (if licensed for Centrus*COA*) forwarded, as well as the estimated completion time.

Within the Process dialog, you can perform several different functions using the buttons on the right side of the dialog. These functions are described below.

Find

Click the **Find** button to process the current address as it appears in the *Inputs* section. The results of the process are displayed in the *Results* section of the dialog. The address may be edited and geocoded as often as necessary in order to receive a proper match

Next Error

Click the **Next Error** button to process the address file until the next unmatched record is encountered The unmatched record will be displayed in

the *Inputs* and *Results* sections, along with the reason that no match could be made. The address can be edited to correct any errors or other flaws in the address. Click the **Next**, **Next Error** or **Batch** buttons to continue processing.

This feature is useful if you wish to maximize the number of matches that can be received.

Batch

Click the **Batch** button to begin processing records without interruption. Centrus will process the entire file, displaying statistics for the number of records processed. The *Inputs* and *Results* areas of the dialog will not be updated during batch processing.

Once batch processing begins, all buttons except **Cancel** will appear dimmed. Click the **Cancel** button to interrupt processing on the current record and display the same options that were available before batch processing began. The current record is displayed in the *Inputs* and *Results* sections.

Next

Click the **Next** button to save the current information in the *Results* section to the output file and load the next address for processing. This function is useful for interactive processing of a file, or if you wish to verify the results of every match. If you are processing unmatched records only, clicking this button will load the next unmatched record.

Previous

This button is not available if you are processing an ASCII file or writing to a separate output file. Clicking the **Previous** button saves the current information in the *Results* section to the output file, and loads the previous address for processing. If you are writing a Reject file or Audit report, you will be warned that they will be aborted if you load the previous record. If you are writing a Log report, the statistics section at the bottom of the report will be omitted.

Goto...

Click the **Goto...**button to jump to an absolute record number. If you are processing an ASCII file or writing to a separate output file, you can only jump forward in the file. If you are writing a Reject file or Audit report, and you choose to jump to a previous record, you will be warned that these files will be aborted if you perform the jump. If you are writing a Log report and jump backward in the file, the statistics section at the bottom of the report will be omitted.

Reload

Click the **Reload** button to load the original data from the address file into the *Inputs* and *Results* sections. To geocode the record, click the **Find**

button. This button is useful if you have made a number of edits to an
address in an attempt to receive a geocode, and would like to return to the
original address in the address file.

Query...

If you are unable to produce a match by editing an address and using the
Find button, click the **Query...** button to display the Query dialog. See "The
Query Function" on page 41 for complete information on this function.

Map...

Click the **Map...**button to display streets and county boundaries for the city
entered. The currently geocoded point is shown when the map is first
displayed. The map function can be used to place unmatchable addresses, or
simply to view streets in an area. See "Map Viewer" on page 48 for more
information.
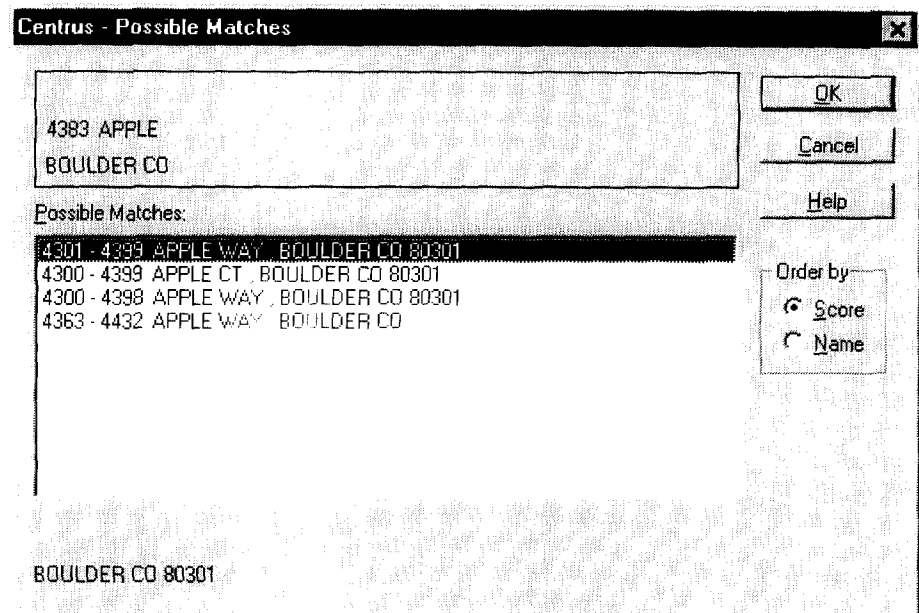
Cancel

Click the **Cancel** button to abort the current geocoding process. If you are
updating a file in place, the process will be stopped, and records that have
been processed will remain coded. If you are creating an output file, you will
be asked if you wish to *"Save geocodes from current process?"*. The
possible choices are:

- **Yes**—Skip the remaining records. If you are writing all records to an
  output file, then the remaining records will be copied to the output
  file, which could take some time. If you are not storing all records to
  the output file, then the remaining records will be written to the
  Reject file, if specified, which can also take some time.

- **No**—This option erases any output and Reject files.

- **Cancel**—This option continues processing and returns to the
  Process dialog.

Possible Matches Dialog

If processing was initiated by using the **Find**, **Next** or **Next Error** buttons,
Centrus may display a Possible Matches dialog. This dialog appears if
Centrus could not determine on its own which record matches the input
address. When this dialog is displayed, you can either select one of the
addresses displayed, or click the **Cancel** button if none of the displayed
addresses is an appropriate match. This dialog can also appear if you are
using QuickFind.

Centrus - Possible Matches

4383 APPLE

BOULDER CO

Possible Matches:

4301 - 4399 APPLE WAY , BOULDER CO 80301
4300 - 4399 APPLE CT , BOULDER CO 80301
4300 - 4398 APPLE WAY , BOULDER CO 80301
4363 - 4432 APPLE WAY   BOULDER CO

OK

Cancel

Help

Order by
  (•) Score
  ( ) Name
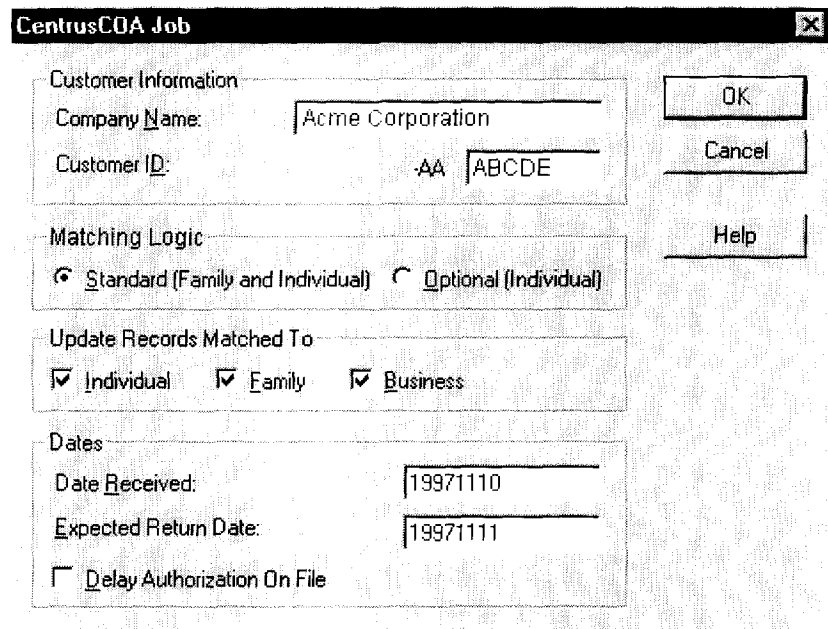
BOULDER CO 80301

You can adjust the way possible matches are displayed using the radio buttons in the *Order by* section. **Order by Score** sorts them from the "most likely" candidate to the "least likely" candidate. **Order by Name** does a simple sort based upon the street name.

Processing with Centrus *COA*

If you are using Centrus*COA*, you'll see an additional dialog before processing begins:

CentrusCOA Job

Customer Information

Company Name: Acme Corporation

Customer ID: -AA   ABCDE

Matching Logic
  (•) Standard (Family and Individual)   ( ) Optional (Individual)

Update Records Matched To
  [✓] Individual   [✓] Family   [✓] Business

Dates

Date Received: 19971110

Expected Return Date: 19971111

  [ ] Delay Authorization On File

OK

Cancel

Help

The Centrus*COA* Job dialog displays the information that will be written to the *FASTforward* Customer Service Log file. You should check this information before starting each job, and edit the information as necessary.

Customer Information

Company Name is the name of the "customer"—that is, the client whose list is being processed. The USPS requires that you assign each *FASTforward* customer a unique eight-character **Customer ID**. The first three characters of the Customer ID are the same as the USPS Platform ID you specified in the Options dialog, and cannot be edited. The remaining five characters complete the Customer ID.

Matching Logic

Matching Logic determines how *FASTforward* will search for a matching record. If you select **Standard (Family and Individual)**, *FASTforward* will search for records matching the address and last name. If you select **Optional (Individual)**, *FASTforward* will search for records matching the address and all name components (first name, middle initial, last name, and title).

Update Records Matched To

There are three types of Change of Address records in the *FASTforward* database: **Individual, Family**, and **Business**. The **Update Records Matched To** check boxes determine which record types *FASTforward* returns as matches. You can specify one, two, or all three types. For example, if you check Individual and Family, a name and address that match to a Business Change of Address record will not be forwarded.

Dates

USPS *FASTforward* regulations require that customer mailing list files be processed within seven business days of receipt, unless a longer period is specified by the customer in writing.

Date Received is set by default to the current date. **Expected Return Date** is set to the day after the current date. If the customer has authorized a delayed return date. check the **Delay Authorization On File** box.

Reference

System Messages and Codes

Match Codes

The following codes are returned by the Match Status processing function in Geocode Assignment

Ennn   Indicates an error. or no match. This can occur when the address entered either simply did not exist in the GSD files, or the address was badly malformed and could not be parsed correctly. The two digits of an error code indicate which parts of an address were unable to be matched to the GSD file, see table below:

    000   No address found by Address Wizard

    001   Low level error, call for support.

    002   Could not find GSD file for that state.

    003   Incorrect GSD file signature or version ID.

    004   GSD file out of date (can only occur in CASS mode).

    010   No city+state or ZIP Code was found.

    011   Input ZIP was not in the directory.

    012   Input city was not in the directory.

    013   Input city was not unique in the directory.

    014   Out of licensed area.

    020   No matching streets found in directory.

    021   No matching cross streets for an intersection match.

    022   No matching ranges.

    023   Two or matches were possible and will be displayed in non-batch processing.

    024   No matching ranges (same as 22).

    025   Too many possible cross streets for intersection match.

    026   Unable to find any address elements in Multiline mode.

Shh   Indicates a match found in USPS data. This is considered the best address match, since it was matched directly against the USPS list of deliverable addresses See below for the interpretation of the hex digits.

Ahh   Same as Shh. but indicates match to an alias name record.

D00   Match is a small town with P.O. Box and/or general delivery only.

Uhh   Indicates match found in USPS data but the ZIP+4 code can not be resolved without the firm name or other information. See below for the interpretation of the hex digits. In CASS mode, an E023 (multiple match) error code will be returned.

Thh   Indicates a match to the street network file, but not to the USPS data.

Xhhh   Match found was for an intersection of two streets, e.g., "Clay St & Michigan Ave." Please note that the USPS does not allow intersections as a valid deliverable address. See below for the interpretation of the hex digits. The first hex digit refers to the first street in the intersection, the second hex digit refers to the second street in the intersection and the third hex digit refers to the last line information.

Yhhh   Same as Xhhh, but indicates that an alias name record for one or both streets was used. The first hex digit refers to the first street in the intersection, the second hex digit refers to the second street in the intersection and the third hex digit refers to the last line information.

Z   No address was given, but the ZIP Code was verified as valid.

Return Codes For Match Codes–First Hex Digit

0   No change in last line

1   ZIP Code was changed.

2   City was changed.

3   City and ZIP Code were changed.

4   State was changed

5   State and ZIP Code were changed.

6   State and City were changed.

7   State, City and ZIP Code were changed.

8   ZIP+4 was changed.

9   ZIP and ZIP+4 were changed.

A   City and ZIP+4 were changed.

B   City, ZIP and ZIP+4 were changed.

C   State and ZIP+4 were changed.

D   State, ZIP and ZIP+4 were changed.

E   State, City and ZIP+4 were changed.

F   State, City, ZIP and ZIP+4 were changed.

Return Codes For Match Codes–Second and Third Hex Digit

0   No change in address line.

1   Street type was changed

2   Pre-directional was changed.

3	Street type and Pre-directional were changed.
4	Post-directional was changed.
5	Street type and Post-directional were changed.
6	Pre-directional and Post-directional were changed.
7	Street type. Pre-directional and Post-directional were changed.
8	Street name was changed.
9	Street name and Street type were changed.
A	Street name and Pre-directional were changed.
B	Street name. Street type and Pre-directional were changed.
C	Street name and Post-directional were changed.
D	Street name, Street type and Post-directional were changed.
E	Street name, Pre-directional and Post-directional were changed.
F	Street name Street type, Pre-directional and Post-directional were changed

Location Codes

Location codes indicate the accuracy of the assigned geocode. There are two types of geocodes—*Address* and *ZIP+4* centroids.

Address geocodes are simple to interpret because they indicate a geocode made directly to a street segment (or two segments in the case of an intersection). *ZIP+4* centroids, however, have a range of "confidence" depending upon how the ZIP+4 centroid was determined. An "E" code indicates that no geocode was possible.

Address Location Code Descriptions

Address location codes detail the known qualities about the geocode. An address location code has three characters. The first character is always an "A", indicating an address location. The second character is either an "S", indicating a location on a street range, or an "X", indicating a location on an intersection of two streets. The third character is a digit, indicating other qualities about the location. Address codes are defined in detail on the next page.

Address Location Codes

ASn   Indicates a house range address geocode. This is the most accurate geocode available. The digit at the end indicates the following:

  0   Best location.

  1   Street side is unknown. The Census FIPS Block ID from the left side is assigned, however no offset is assigned, the point is placed directly on the intersection.

  2   Address was interpolated onto a TIGER segment that did not contain address ranges initially.

  3   Both and

7   Indicates a match to a GDT placeholder point. Occurs only
          with GDT data.

AX3   Indicates an intersection geocode. The street side cannot be
          determined, and no address ranges can be assigned, hence the "3" is
          returned to be consistent with AS codes.

ZIP+4 Centroid Location Code Descriptions

ZIP centroid codes actually indicate the quality of two location attributes:
Census ID accuracy, and *positional accuracy*. The first character is always a
"Z", indicating a location derived from a ZIP centroid. The second character
indicates Census ID accuracy and the third character indicates location type.
The last character indicates how the location and Census ID was defined.
This last code is provided for completeness, and may not be useful for most
applications. If this is the case, the width of the Location Code field can be
set to three and this last identifier will not be returned.

2nd Character (Census ID Accuracy)

B   Indicates Block Group accuracy (most accurate).

T   Indicates Census Tract accuracy.

C   Indicates unclassified Census accuracy. Normally accurate to at least
          the County level

3rd Character (Positional Accuracy)

9   Indicates location based upon a ZIP+4 centroid. These are the most
          accurate centroids and will normally place the location on the
          correct block face. For a small number of records, the location may
          be the middle of the entire street on which the ZIP+4 may fall. See
          the 4th character for a precise indication of locational accuracy.

7   Indicates location based upon a ZIP+2 centroid. These locations can
          represent a several block area in urban locations, or slightly larger in
          rural areas.

5   Indicates the location of the Post Office that delivers mail to that
          address, or a 5-digit ZIP Code centroid, or a location based upon
          locale (city). See the 4th character for a precise indication of
          locational accuracy

4th Character (Methodology)

In practice, there are 23 possible combinations of location codes, one for
each methodology type Therefore, in this section we list the entire location
code at the end of the description for each methodology.

A   Created via address matching to a single segment. Location is
          assigned in middle of matched street segment, offset 50' to the
          proper side of the street (ZB9A).

a   Created via address matching to a single segment, but the correct
          side of the street is unknown. Location is assigned in the middle of

the matched street segment, offset 50' to the left side of the street, as address ranges increase (ZB9a).

B   Created via address matching to multiple segments, all segments have the same Block Group. Location is assigned to the middle of the matched street segment with the most house number ranges within this ZIP+4. Location is offset 50' to the proper side of the street (ZB9B).

b   Same as methodology B except that the correct side of the street is unknown. Location is assigned in the middle of the matched street segment, offset 50' to the left side of the street, as address ranges increase (ZB9b).

C   Created via address matching to multiple segments, all segments have the same Census Tract. The Block Group that represents the most households in this ZIP+4 is returned. Location is assigned to the middle of the matched street segment with the most house number ranges within this ZIP+4. Location is offset 50' to the proper side of the street (ZT9C).

c   Same as methodology C except that the correct side of the street is unknown. Location is assigned in the middle of the matched street segment, offset 50' to the left side of the street, as address ranges increase (ZT9c).

D   Created via address matching to multiple segments, all segments have the same County. The Block Group that represents the most households in this ZIP+4 is returned. Location is assigned to the middle of the matched street segment with the most house number ranges within this ZIP+4. Location is offset 50' to the proper side of the street (ZC9D).

d   Same as methodology D except that the correct side of the street is unknown. Location is assigned in the middle of the matched street segment, offset 50' to the left side of the street, as address ranges increase (ZC9d).

E   Created via street name matching (no house ranges available). All matched segments have the same Block Group. Location placed on the segment that is closest to the center of matched segments. In almost all cases, this will be on the mid-point of the entire street (ZB9E).

F   Created via street name matching (no house ranges available). All matched segments have the same Census Tract. Location placed on the segment that is closest to the center of matched segments. In almost all cases, this will be on the mid-point of the entire street (ZT9F).

G   Created via street name matching (no house ranges available). All matched segments have the same County. Location is placed on the segment that is closest to the center of matched segments. In almost all cases, this will be on the mid-point of the entire street (ZC9G).

H	Same as methodology G, but some segments were not in the same County. This methodology is used for less than .05% of the centroids (ZC9H).
I	Created ZIP+2 cluster centroid as defined by methodologies A, a, B and b. All centroids in this ZIP+2 cluster have the same Block Group. Location is assigned to the ZIP+2 centroid (ZB7I).
J	Created ZIP+2 cluster centroid as defined by methodologies A, a, B, b, C and c. All centroids in this ZIP+2 cluster have the same Census Tract. Location is assigned to the ZIP+2 centroid (ZT7J).
K	Created ZIP+2 cluster centroid as defined by methodologies A, a, B, b, C, c, D and d. Location is assigned to the ZIP+2 centroid (ZC7K).
L	Created ZIP+2 cluster centroid as defined by methodology E. All centroids in this ZIP+2 cluster have the same Block Group. Location is assigned to the ZIP+2 centroid (ZB7L).
M	Created ZIP+2 cluster centroid as defined by methodology E and F. All centroids in this ZIP+2 cluster have the same Census Tract. Location is assigned to the ZIP+2 centroid (ZT7M).
N	Created ZIP+2 cluster centroid as defined by methodology E, F, G and H. Location is assigned to the ZIP+2 centroid (ZC7N).
V	Over 95% of addresses in this ZIP Code are in a single Census Tract. Location is assigned to the ZIP Code centroid (ZT5V).
W	Over 80% of addresses in this ZIP Code are in a single Census Tract. Reasonable Census Tract accuracy. Location is assigned to the ZIP Code centroid (ZC5W).
X	Less than 80% of addresses in this ZIP Code are in a single Census Tract. Census ID is uncertain. Location is assigned to the ZIP Code centroid (ZC5X)
Y	Generally indicates a rural or sparsely populated area. Census code is uncertain. Location is based upon the USGS places file (ZC5Y).
Z	Generally assigned for P.O. Box or General Delivery addresses. Census code is uncertain. Location is based upon the Post Office location that delivers the mail to that address (ZC5Z).